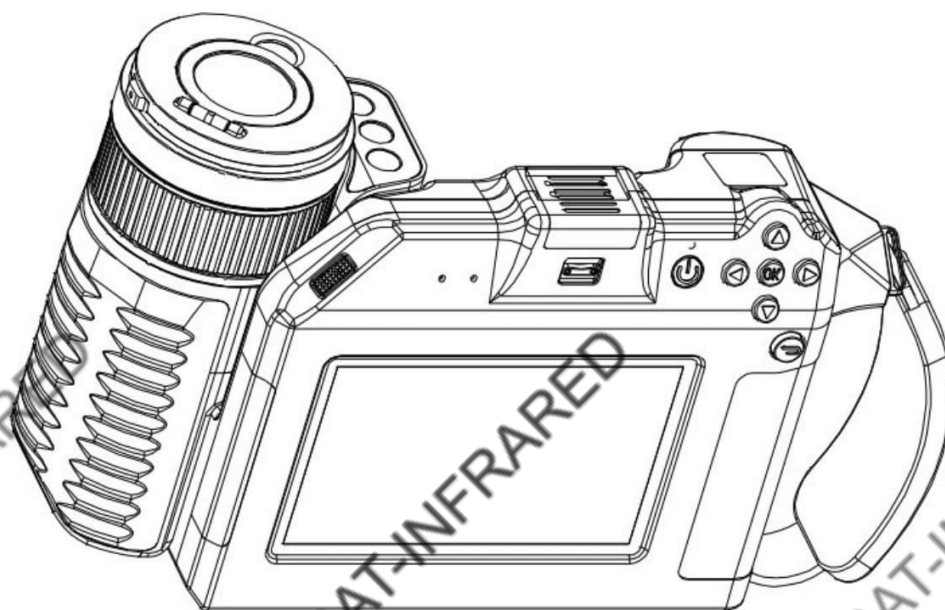# SATIR

Performance Level Thermal Camera

# P 1 1024x768

*User's manual*

### Trademark Acknowledgments
• SATIR is a trademark of SATIR Europe Ireland Ltd.
• Other names and products not mentioned above may be registered trademarks or trademarks of their respective companies.

# Contents

# 1 Summary

This infrared imager uses an uncooled focal plane infrared detector to display the infrared thermal image of the object in front of you in the form of high-definition and high-sensitivity pseudo color images; The image and voice can be stored on the memory card for computer analysis.

**Main Applications:**

1)  Preventive Maintenance

➢ Power Industry: Thermal state inspection of transmission lines and power equipment, fault, and defect diagnosis.

➢ Electrical System: Identify in advance before circuit overload occurs.

➢ Mechanical System: Reduce downtime and prevent failures.

2)  Architectural Science

➢ Roof: Quickly and efficiently detect water seepage.

➢ Building Structure: Carry out infrared energy assessment survey for commercial and residential buildings.

➢ Moisture Detection: Find the source of moisture and mildew.

➢ Repair: Evaluate remedial measures to ensure that the area is completely dry.

3)  Other Applications

➢ Iron and Steel Industry: Monitoring of steelmaking and rolling process, diagnosis of hot blast furnace damage, detection of plate embryo temperature, etc.

➢ Fire Protection: Forest fire prevention and potential fire source search, self-ignition prevention and detection of special materials, electrical fire safety detection.

➢ Medicine: Detection of body surface temperature and analysis of temperature field distribution.

➢ Petrochemical Industry: Oil pipeline condition inspection, material interface inspection, heat leakage and insulation structure, power equipment condition inspection, etc.

## 2 Warning、Being careful and Note

### 2.1 Definition

**！Warning**   Represents a hazardous situation or action that could result in personal injury

**！Being careful**   Represents a situation or action that could result in damage to the camera or permanent loss of data.

**！Note**   Represents useful prompt information for the user.

### 2.2 Important Information – read before using the instrument

**！ Warning -** This instrument has a built-in laser do not point at human eyes.

**！ Being careful -** Because the thermal imager uses a very sensitive thermal sensor, under any circumstances (on or off), the lens must not be aimed directly at a strong radiation source (such as the sun, direct or reflected laser beams, etc.), otherwise it will cause permanent damage to the camera!

**！ Being careful** - Avoid oil stains and various chemical substances to contaminate the lens surface and damage the surface. After use, please close the lens cap.

**！ Being careful** - To prevent the potential danger of data loss, always back up your data to your computer.

**！ Being careful** - Do not open the case as this would invalidate the warranty . or make modifications without authorization, maintenance matters can only be carried out by authorized personnel of the company.

**！ Note** - The camera requires several minute warm-up process before accurate readings. (optimize the internal electronics)

**！ Note -** Each thermal imager has been calibrated for temperature at the factory, and it is recommended to perform temperature calibration every year.

**！ Note -** The file system supported by the device is an SD card in FAT32 format. For details, refer to chapter 5.1.3.1.

## 3 Appearance Introduction

## 3.1 Introduction to Thermal Imager Components

## 3.1.1 Front Structure Diagram
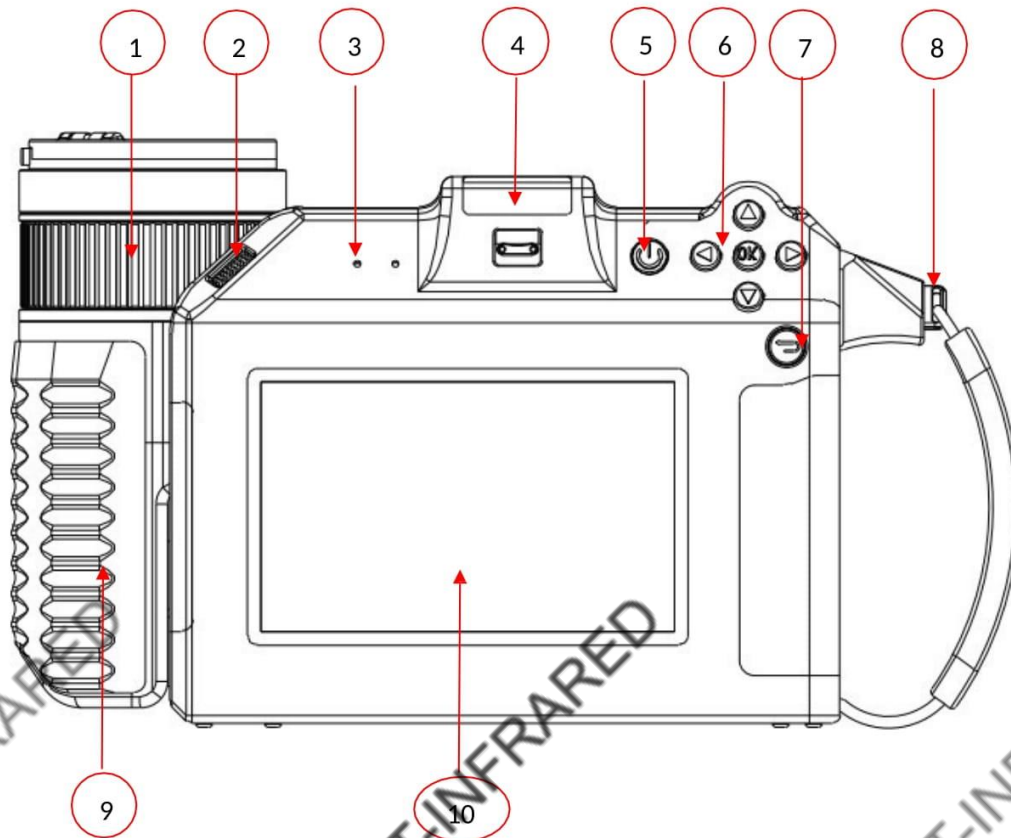


| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Infrared Lens Focusing Ring | The focus ring can be manually rotated clockwise or anticlockwise to ensure the imaging clarity of the thermal imager. |
| 2 | Speaker | Sound amplification. |
| 3 | Microphone | Record sound. |
| 4 | Viewfinder Interface | Where the viewfinder is installed. |

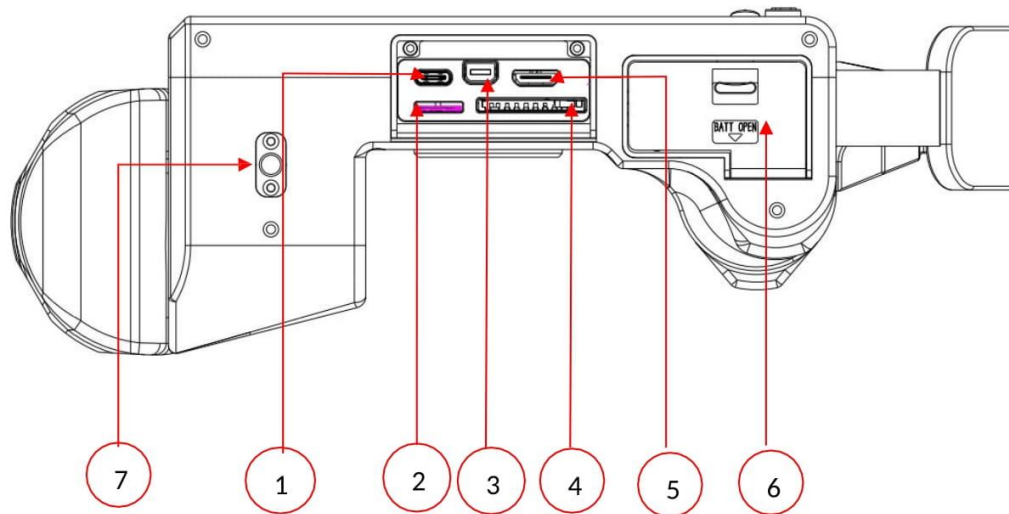| | | |
|---|---|---|
| 5 | Power Button | The power switch is used to turn on and off the thermal imager.<br>Boot: When the device is off, press and hold the key to turn on the device.<br>Shutdown: When the device is on, press and hold the power button to enter the shutdown option interface "Restart, Standby, Shutdown, Return" and long press the power button for more than 10s to directly shut down. In standby mode, press the on key briefly to start the device.<br>**! Note:** After shutting down, it is recommended to wait at<br>least 10s to turn it on again to ensure the safety of the thermal imager. |
| 6 | Directio n Control Key | Selection key: In the direction operation area, you can use the direction keys to switch operations up, down, left and right after selecting the target.<br>OK key: confirm the selected target and enter the target module. |
| 7 | Back Button | Short press: return to the previous interface.<br>Long press: return to the main interface. |
| 8 | Wrist Strap Fixing Interface | Secure wrist strap. |
| 9 | Rotatable Lens | Focused infrared radiation. |
| 10 | Multi Touch Screen | Display |

### 3.1.2 Side Structure Drawing
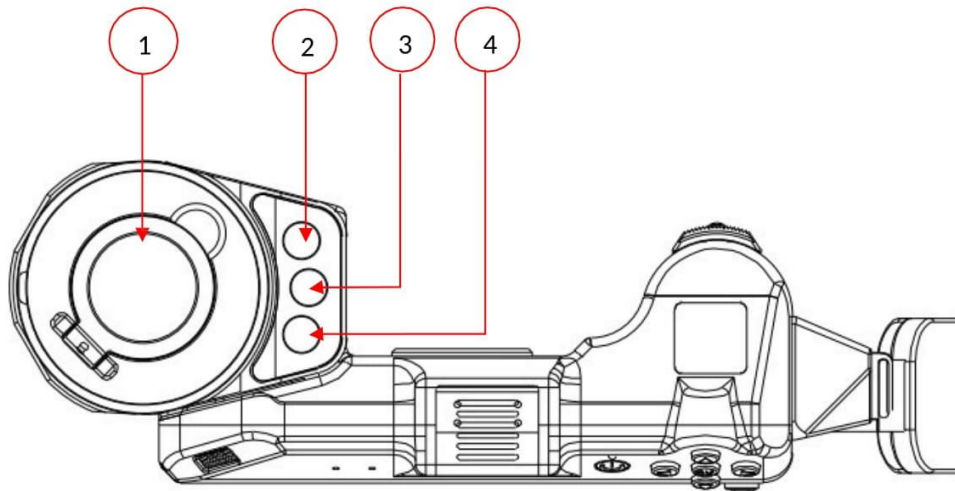


| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Lens Cap | Protect the lens. |
| 2 | LED Light | Auxiliary lighting. |
| 3 | Digital Camera | Take visible pictures. |
| 4 | Red Laser Indicator | Indication and positioning. |

| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Data Line Interface | Output image and video. |
| 2 | Communication Card Interface | Used to insert the communication card. |
| 3 | Debug Interface | Network communication and debugging. |
| 4 | Memory Card Interface | Used to insert SD card. |
| 5 | Video Interface | To output HDMI video. |
| 6 | Protective Cover for Lithium Battery Compartment of Thermal Imager | Protect the battery. |
| 7 | Standard Tripod Mounting | Tripod connector. |

| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Electronic Focus Button | For real-time image, you can adjust the focal length of the lens and the definition of the image by moving left and right. Press the focus button to automatically focus. |
| 2 | Camera Key | When the real-time image screen is displayed, press the camera key once to enter the frozen screen state. When the picture is frozen, gently press the camera key again to save the thermal image file to the storage medium of the thermal imager. In the video recording mode, press the camera key once to start recording small full radiation video. When starting video recording, gently press |

| | | |
|---|---|---|
| | | the |
| | | camera key once to save the full radiation thermal |

| | | image small video to the storage medium of the thermal imager. |
|---|---|---|
| | | In the timed shooting mode, press the camera key |
| | | once to start the timed shooting. |
| | | When starting the timed shooting, press the camera key once to start the timed shooting. |
| | | Press and hold for more than 2s to trigger the auto |
| | | focus function. |
| 3 | Product Information QR Code | For querying product related information. |
| 4 | Product Nameplate | Product Name, Serial Number under Interface Cover Plate . |
| 5 | Neck Strap Fixing Interface | Secure the neck strap. |

### 3.2 Rotating the Lens Up and Down

Advantages: It is safer to look down and more convenient to look up.

In order to prevent the thermal imager users from being overworked and causing related damage, our portable infrared imager is designed from the perspective of ergonomics. Please refer to the following figure for suggestions and examples on how to correctly operate our portable infrared imager.

Please note the following:

Always adjust the angle of the touch screen to suit your working posture. When holding the thermal imager in the right hand, make sure to support the optical system housing with the left hand at the same time. This will greatly reduce the fatigue of the right hand.
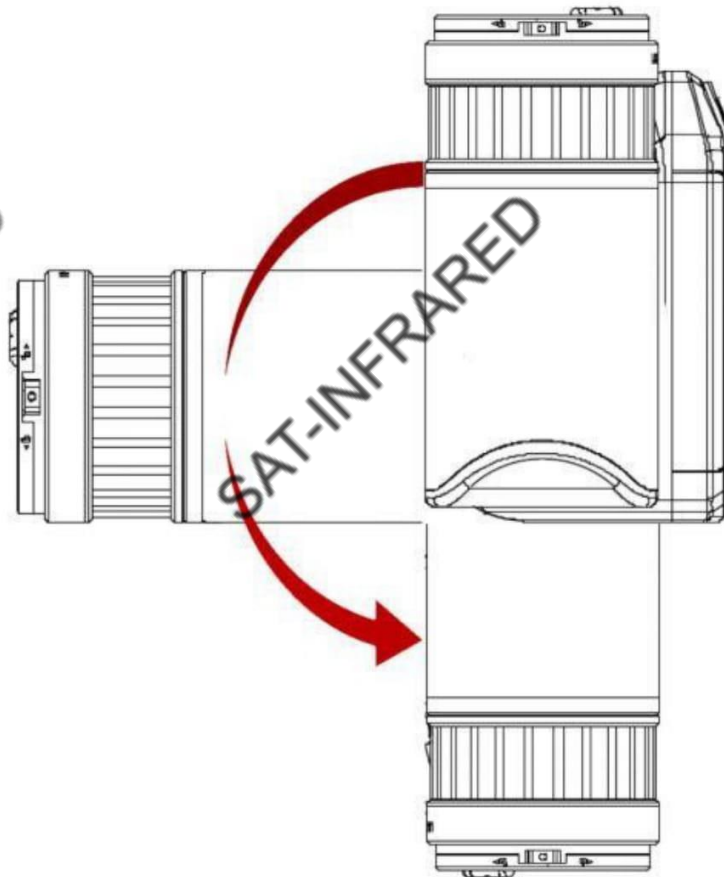
**3.3 Interface**
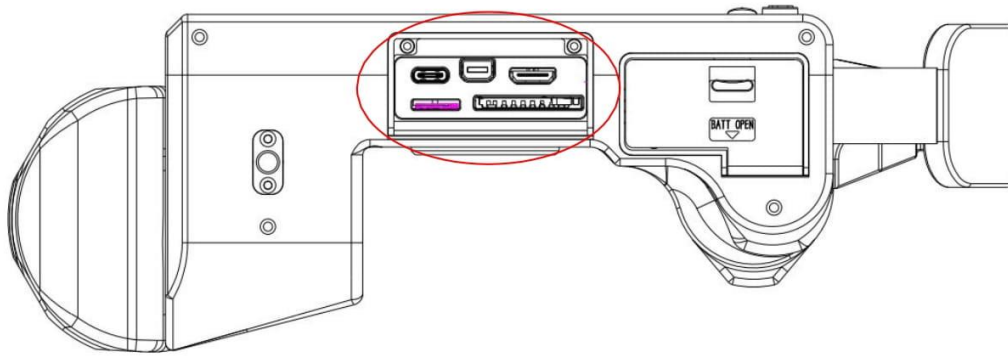


➢ USB Output Interface: This interface can be connected with a computer to transmit data through a USB cable.

➢ Memory Card Slot: Use high-speed memory card for instrument upgrading and image saving.

➢ Video Interface: Used for video output.

➢ Power Interface: External power input interface.

**4 Basic Operation**

**4.1 Battery Installation and Replacement**

**4.1.1 Battery Handling**
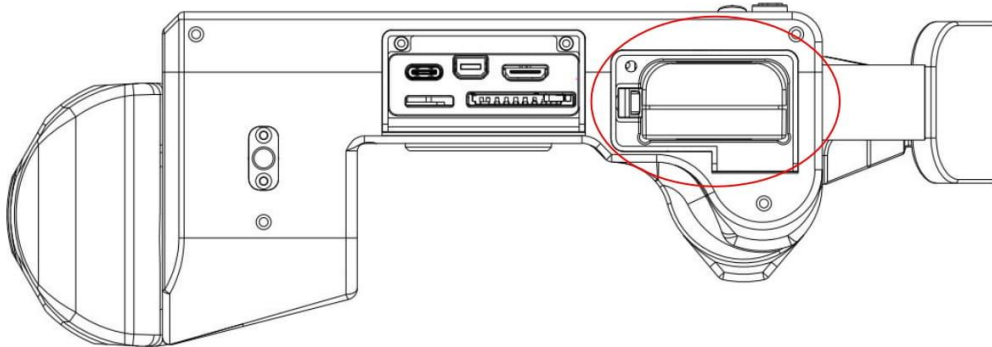


➢ The battery compartment is in the instrument handle. Push the push button at the bottom of the battery cover, and open the battery button to load and unload the battery

➢ When inserting the battery, please note that the end of the battery with contacts is inserted into the battery compartment first.

➢ Close the battery cover and use the instrument after hearing a "snap".

**! Note**: The instrument should use the battery with standard configuration, otherwise the mechanical or electrical performance of the instrument may be damaged due to incorrect battery size and voltage.

**4.1.2 Replace the Battery**

When the battery has about 20% power left, the instrument will display a prompt message (Battery power is low, please replace the battery!). After that, this prompt will pop up at intervals until it is automatically shut down. The effect is as follows:
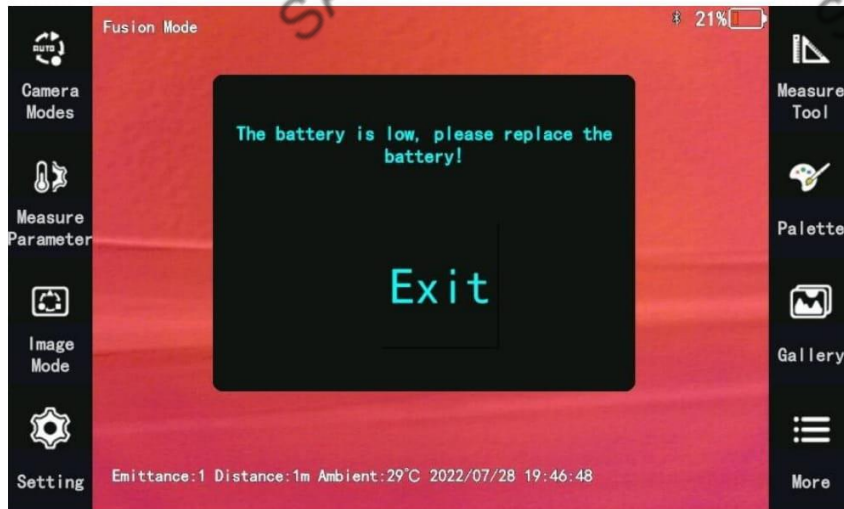
### 4.1.3 Common Sense of Safe Use of Battery

The battery shall be stored at an ambient temperature of 0 ℃ - 30 ℃ as far as possible. Due to a small amount of self-discharge during storage, the battery shall be fully charged for storage in order to avoid possible over discharge during storage which may affect the battery capacity. In order to better protect the battery, the battery shall be charged at least once a month when not in use. The time interval is as follows: each charge must be more than 50% of the battery capacity.

The battery should be charged at an ambient temperature of 0 ℃ - 40 ℃. Charging at an ambient temperature of 0 ℃ will reduce the battery capacity. Charging above 40 ℃ may cause the battery temperature to be too high and cause damage.

！ **Warning:**

! Do not disassemble, squeeze or stab the battery;

! Do not short circuit the external contacts of the battery;

! Keep the battery dry and do not put it in fire or water;

! Please do not place it in a place easily accessible to children;

! Please dispose of the waste battery according to the regulations of the local government;

! When the machine is not used for a long time, it is recommended to remove the battery from the machine.

**4.2 Basic Steps**

Please follow these steps:

1. Put the battery into the battery compartment of the thermal imager.

2. Before starting the thermal imager for the first time, charge the battery to the full power state.

3. Insert the memory card into the memory card slot.

4. Press the power button to turn on the thermal imager.

5. Aim the thermal imager at the target object.

6. Adjust the focus rocker to make the best focus.

7. Press the camera key once to freeze the image. In this state, the thermal image can be analyzed at will.

8. Press the camera key again to save the analyzed thermal image automatically.

9. Open the USB flash disk and copy the built-in analysis software of the USB flash disk to the PC.

10. Install professional analysis software and related drivers on PC.

11. Start professional analysis software.

12. Use the USB cable to connect the thermal imager to the computer.

13. Import images into professional analysis software on PC or through memory card.

14. In the quick collection column under the professional analysis software, right-click the blank space and select add thermal image file.

15. Click one or more thermal images in the quick favorites bar under the software.

16. Analyze, save and generate reports.

17. Click export to export the report as a word file.

18. Send the word report to the client.

**! Note:** It is very important to adjust the focal length. Incorrect focal length adjustment will affect the imaging clarity and the measurement accuracy of the thermal imager.

### 4.3 Operation

### 4.3.1 Obtaining Thermal Images

After installing the battery, press the power switch of the thermal imager until the power light comes on. After about 25 seconds, the initialization of the instrument is completed. After the calibration of the calibration plate is completed, the instrument enters the working state.

Open the lens cover, aim at the target, and adjust the focal length of the thermal imager lens to make the target image clear.

**! Note:** Poor focusing will lead to measurement errors. Please use the focusing rocker to adjust the focal length to the best.

### 4.3.2 Temperature Measurement



➢ After startup, the screen will automatically generate a central temperature measurement area - ⊠ and display the central temperature and maximum temperature of the selected area.

➢ Click the selected area to adjust the size of the temperature measurement area up, down, left and right.

➢ When the target temperature is greater than or less than the upper or lower limit temperature corresponding to the temperature measuring gear of the thermal imager, the screen temperature will display ＞ XXX ℃ or ＜ XXX ℃, XXX represents

the upper or lower limit temperature of the selected gear. (For example, the above figure shows the performance of normal temperature objects in the temperature range of +150 ℃ ~+650 ℃)

### 4.3.3 Analysis Mode

Add analysis to the Image

### 4.3.4 Saved Image

➢ After capturing, or from the gallery, you can enter the analysis mode.

➢ Automatically enter the analysis mode after capturing, as shown in the figure.

➢ Click in the gallery interface ✎ to enter the analysis mode.
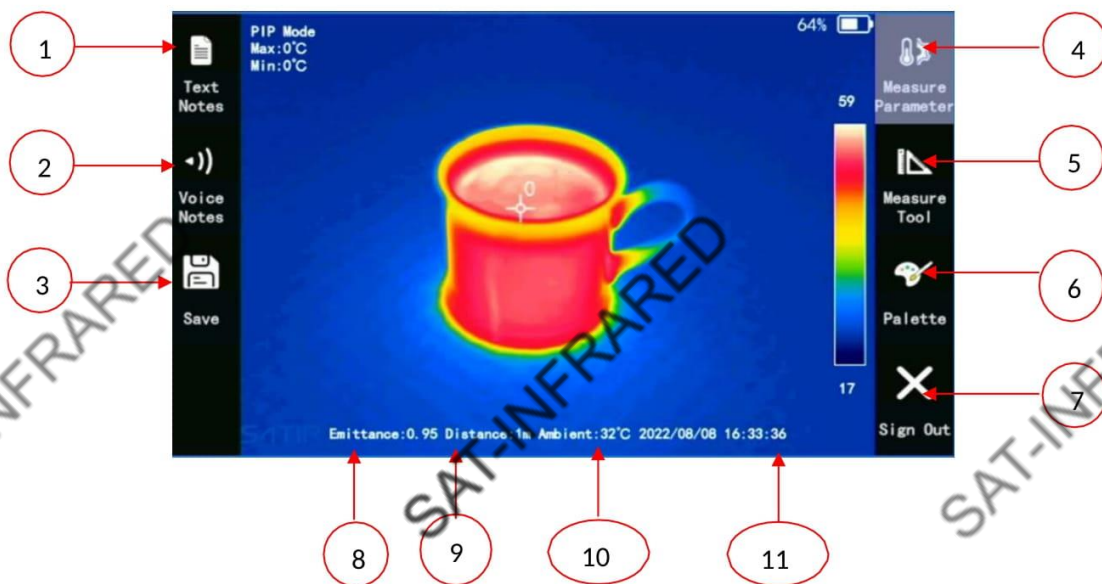


Information on the bottom of the display (8 to 11) selectable and can be switched on / off . see menu setting 4.1.3

| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Text Annotation | Click to enter the text annotation page. |
| 2 | Voice Notes | Click to enter the voice notes page. |
| 3 | Save | Click to save the current photo to the gallery and return to the real-time screen. |
| 4 | Temperature Measurement Parameters | Click the temperature measurement parameter menu to adjust the temperature measurement related parameters: emissivity, temperature measurement distance, ambient temperature, relative humidity, reflection temperature, transmittance, temperature measurement compensation. |
| 5 | Measuring Tools | Click to enter the measurement tool options and management. |
| 6 | Palette | Click to open the floating menu bar, and you can select other pseudo color options. |
| 7 | Exit | Click to exit the analysis mode and return to the previous interface. |
| 8 | Emissivity | Emissivity value display. |
| 9 | Measuring Distance | The measured distance value is displayed. |
| 10 | Ambient Temperature | Ambient temperature value display. |
| 11 | Time | Capture time display. |

### 4.3.4 Setting Temperature Range

The temperature range for the Camera can be found under the System Setting Menu (Menu 4.4.1)

The Camera will optimize the image then in either of the range subject to the Manual or Auto mode.



Select the range required -40° C to 150°C or +150°C to 650°C
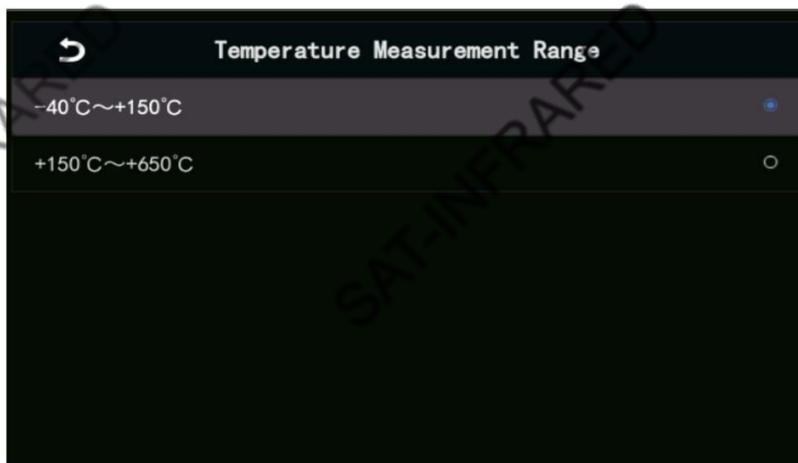
### 4.3.5 Adjusting Level and Span. Manual and Auto Mode

Temperature scale can be adjusted by touching the scale bar as illustrated. Or a

Long press on the left or Right arrows

Select Top, Bottom or both to adjust the values and scroll up and down  until the required value is selected. (Level / Span).

Adjust both settling  -Level (Note both highlighted in Blue)
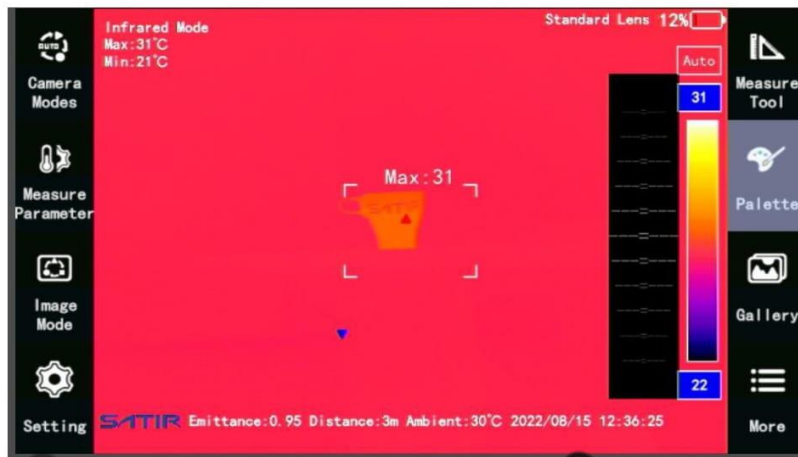


Adjust the lower setting -Span (Note bottom highlighted in blue)

If the top temperature is highlight, then it will adjust the top value.
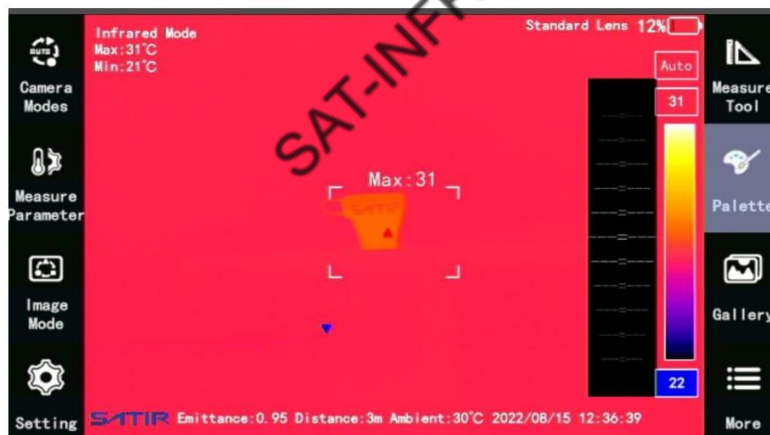
**4.3.6 Export Stored Images**

➢ The USB port is used to download the image in the memory card, and the standard USB cable is used to connect the USB port of the instrument and the PC to export the stored image.

➢ Please remove the memory card, insert it into the memory card reader, and connect it to the USB port of the PC to export the stored image.

**4.3.7 Memory Card Update**

➢ Put the obtained update package named *update.tar.gz* in the memory card.

➢ Insert the memory card into the powered-on instrument and select external storage.

➢ Enter settings - system settings, click program update, and you will be prompted that the program is being updated.

➢ Wait for the instrument to restart automatically, and then complete the software update.

## 5 Operating Instructions

## 5.1 Overview of Main Interface of Thermal Imager

## 5.1.1 Screen Display Information



| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Video Mode | It is used to switch the video mode: single shot, video shooting, full radiation video, automatic photography. |
| 2 | Temperature Measurement Parameters | Used to modify temperature measurement parameters: emissivity, measurement distance, ambient temperature, relative humidity, reflection temperature, transmittance, temperature measurement compensation. |

| 3 | Image Mode | Used to switch image modes: thermal image mode, picture in picture mode, visible light mode and fusion mode. |
|---|---|---|
| 4 | Setting | Used to modify equipment settings: save settings, alarm settings, system settings, image settings, and intelligent assistance. |
| 5 | Battery Status | Display the real-time power of the device. |
| 6 | Baffle Correction | For manual baffle correction, (NUC/ Shutter calibration). |
| 7 | Measuring Tools | It is used for the selection, use and modification of measuring tools. |
| 8 | Palette | Used to modify false colors. |
| 9 | Gallery Management | Used for storage and management of drawing library. |
| 10 | Upper Temperature Limit | The upper limit value of automatic temperature width is displayed in real time and can be adjusted manually. |
| 11 | Zoom | x1- x10 Zoom status |
| 12 | Lower Temperature Limit | The lower limit value of automatic temperature width is displayed in real time and can be adjusted manually. |
| 13 | Emissivity | Emissivity value display. |
| 14 | Measuring Distance | The measured distance value display. |
| 15 | Ambient Temperature | Ambient temperature value display. |
| 16 | Time | Time and date display. |

**! Note:** Different modes have different functions, so the signs in the interface may

not be displayed in various modes, but will be displayed as the function is turned on.

### 5.1.2 Main Screen Menu Function Introduction

### 5.1.2.1 Camera Mode Selection

Divided into single photo, video capture, full radiation video, automatic photo.
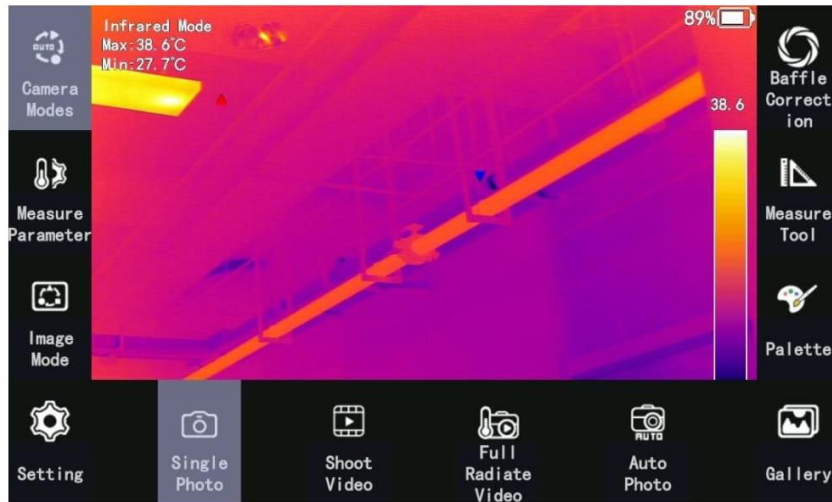


➢ Single Photo: After selecting, press the photo button to take a single image.

➢ Video Capture: After selecting, press the camera button to shoot normal video.

➢ Full Radiation Video: After selecting, press the camera button to shoot full radiation video.

➢ Automatically Photo: You can choose the interval time of a certain time, a certain minute and a certain second to automatically take pictures, and you can choose the number of pictures to be taken.

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## 5.1.2.2 Temperature Measurement Parameter Settings

（1） Emissivity
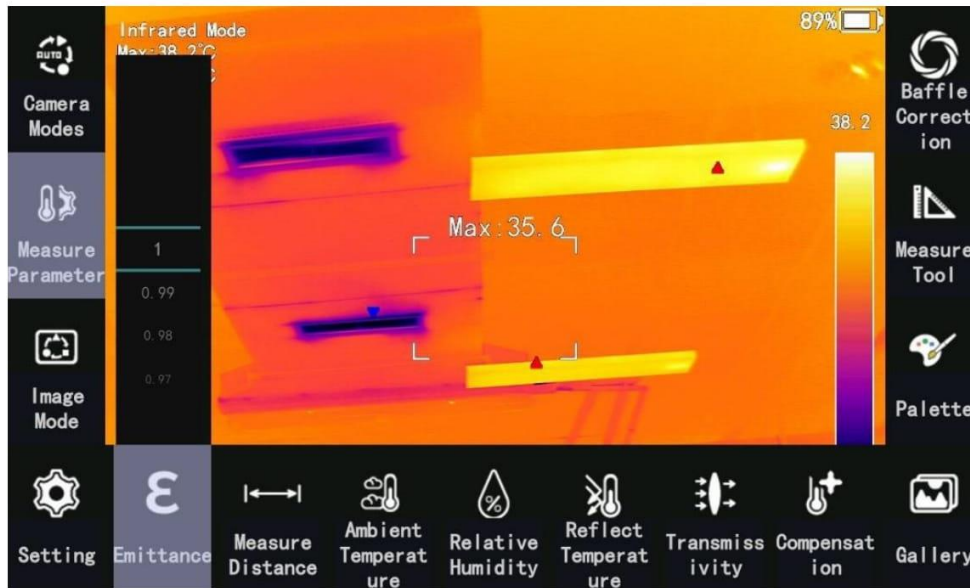


emissivity range: 0 ～ 1, 0.01 ～ adjustment.

Emissivity refers to the ratio of the energy radiated by the measured object to the energy radiated by the blackbody at the same temperature and wavelength. The value is between 0 and 1.

**! Note:** The emissivity of materials is one of the important parameters that affect whether the thermal imager can accurately measure the temperature of the measured object.

Operating steps for emissivity setting:

➢ Click the emissivity setting button , the second-level menu of emissivity will appear.

➢ Swipe up and down the screen emissivity value to select.

➢ Click other areas of the thermal image screen, or click the Exit button to complete the emissivity setting.

（2） Measuring Distance

The measured distance refers to the distance between the measured object and the thermal imager lens. This parameter is used to compensate for the following two situations:

➢ Thermal radiation from the measured target and the atmosphere between the target and the thermal imager lens in the thermal radiation.

➢ Thermal radiation from the atmosphere itself and detected by the thermal imager.

Set measuring distance measuring operation steps:

➢ Click the measure distance button;

➢ According to the actual distance between the measured object and the lens of the infrared thermal imager, slide the distance value on the screen up and down, and set the distance value to the actual value;

➢ Click other areas of the thermal image screen, or click the exit button to complete the measurement distance setting.

**! Note:** In case of short distance or less than the farthest accurate temperature measurement distance of the thermal imager, the measurement distance is usually set as the default value of the infrared thermal imager.

（3） Ambient Temperature

Ambient temperature regulation. Ambient temperature refers to the air temperature between the thermal imager and the target object. Operating steps for setting ambient temperature:

➢ Click the ambient temperature setting button.

➢ According to the actual temperature in the test scene, slide the ambient temperature value of the screen up and down, and set the ambient temperature value to the actual temperature value.

➢ Click other areas of the thermal image screen, or click the exit button to complete the setting of the ambient temperature.

**! Note:** The ambient temperature value is usually the system default value. This parameter needs to be set only when the atmospheric temperature is higher than the actual temperature of the measured target.

（4） Relative Humidity

The thermal imager can compensate for the local influence of the relative humidity in the air on the heat radiation transmission. Therefore, please set the relative humidity to the correct value.

Operating steps for setting relative humidity:

➢ Click the relative humidity button.

➢ According to the relative humidity in the test scene, slide the relative humidity percentage value of the screen up and down, and set the relative humidity value to the actual value.

➢ Click other areas of the thermal image screen, or click the exit button to complete the setting of relative humidity.

**! Note:** In the case of short distance and normal humidity, the relative humidity is usually set as the default value of the infrared thermal imager.

（5） Reflection Temperature

The reflected temperature is used to compensate or correct the reflected thermal radiation on the measured target. If the emissivity of the measured target is low and the actual temperature is much different from the temperature of its reflection source, it is very important to correctly set this parameter and compensate the reflection temperature for accurate temperature measurement.

Operating steps for setting the reflection temperature:

➢ Test the actual temperature of the reflection source near the target with the thermal imager.

➢ Click the reflection temperature setting button.

➢ According to the actual temperature value of the reflection source measured by the thermal imager, slide the screen up and down to set the reflection temperature

value as the temperature value of the reflection source measured by the thermal imager.

➢ Click other areas of the thermal image screen, or click the exit button to complete the reflection temperature setting.

! **Note:** If the field test conditions permit, try to avoid reflection interference as much as possible, which can greatly improve the measurement accuracy.

（6） Transmissivity

Transmittance refers to the transmittance of any external lens or infrared window used in front of the lens of the thermal imager.

Operating steps for setting transmittance:

➢ Measure the actual transmittance of external lens or external infrared window (usually with the help of measurement standard source).

➢ Click the transmittance setting button.

➢ According to the measured actual transmittance, slide the transmittance value on the screen up and down to set the transmittance to the actual value.

➢ Click other areas of the thermal image screen to complete the transmittance setting.

! **Note:** If the optional external optical lens has been calibrated at the factory, or there is no external infrared window, the transmittance is usually set to the default value of the infrared thermal imager.

（7） Temperature Measurement Compensation: Temperature measurement compensation adjustment.

### 5.1.2.3 Image Mode Switching

Image Mode: Click to switch the image mode by default, and the default is infrared mode.

➢ Infrared Mode: The working area displays a real-time infrared thermal image。
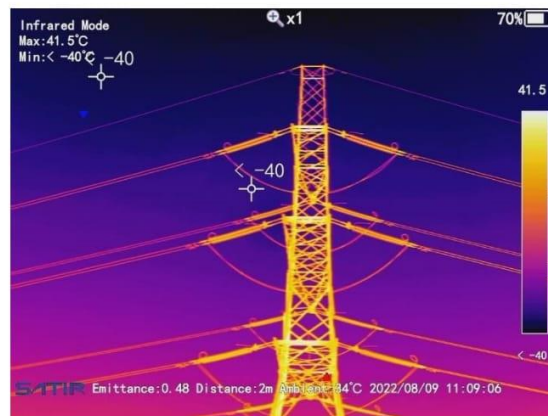


➢ Visible Light Mode: The working area displays a real-time visible light image.
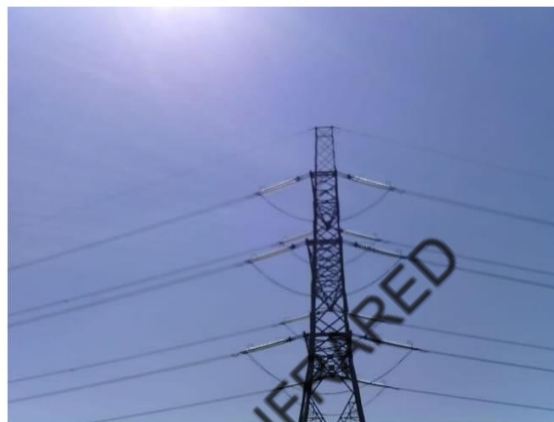


➢ Fusion Mode: The thermal image and visible light image are displayed at the same time, and images are displayed superimposed.

➢ Picture-in-picture Mode: The thermal image and the visible light image are displayed at the same time. The background is the real-time display of the visible light image, the thermal image is displayed in the middle position, the display size of the thermal image can be manually modified:

❖ Switch the image mode to " Picture-in-picture ", click and drag the four corners of the rectangle to adjust the size, click and drag anywhere in the rectangle to move the position



### 5.1.2.4 Baffle Correction Function Introduction or NUC
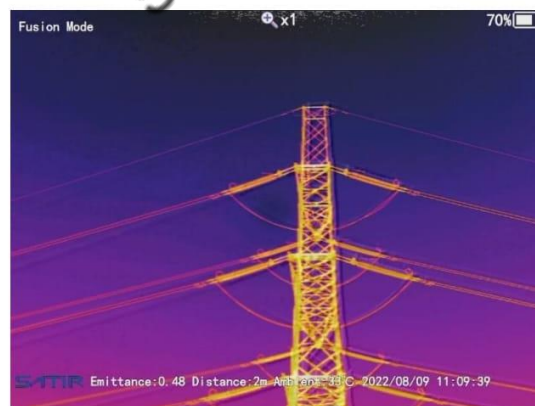
Baffle Correction: Click to complete baffle correction again. Make the imaging better and the temperature measurement more accurate.

➢ This button is a non-uniformity correction button, which is an image correction performed by the thermal imager software. It can compensate for different sensitivities of detector elements and their optical and geometric interference, so as to improve the temperature measurement accuracy.

➢ Automatic baffle correction completes once at every interval.

➢ Manual baffle correction is very important to minimize image interference during critical measurement. Manually click the baffle correction button to punch the plate once to improve the temperature measurement accuracy.

### 5.1.2.5 Measuring Tools Function Introduction
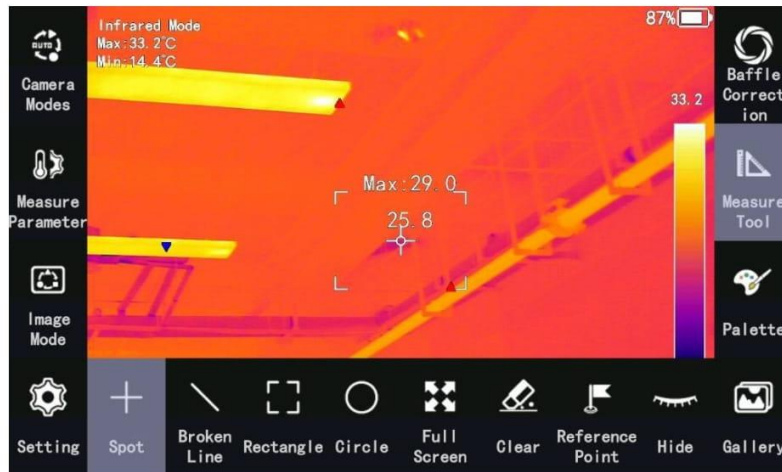


Measuring Tools: Click measuring tools to open the secondary menu of measuring tools, including 4 types of measuring tools (point, polyline, rectangle and circle), full screen, clear, reference point and hide.

➢ The selected areas include points, broken lines, rectangles and circles, and the temperature of the selected areas shall be measured.

➢ Full Screen: Click to display the global information (maximum value, minimum value, position), and click again to hide the global information.

➢ Clear: Clear all added measuring tools.

➢ Reference Point: Full screen reference temperature can be set.

➢ Hide: Click to hide all measuring tools, and click again to display all measuring tools.

After a measurement tool is selected, the secondary menu for operating a single measurement tool will appear, including move, size, delete, next, display, reference point, emissivity and over limit alarm. Click outside the temperature measurement area to cancel the selection.

➢ Move: Select the measuring tool and click to drag the measuring tool.

➢ Size: Select the measuring tool, click and drag the four corners to zoom in and out.

➢ Delete: Select a measuring tool and click to delete it.

➢ Next: Select the measuring tool and click to locate to the next measuring tool.

➢ Display: Select the measuring tool and click to set the display information of the measuring tool (maximum value, minimum value, average value, mark).

➢ Reference Point: Select the measuring tool and click to set the maximum temperature of the current measuring tool as the full screen reference temperature.

➢ Over Limit Alarm: Select the measuring tool and click to set the warning range of the current measuring tool. When the switch is turned on and the preset conditions are met, an audible warning will be given.

### 5.1.2.6 Palette Switch



Palette: Click to make a false color selection. Divided into: iron red, white hot, black hot, blue orange, tea yellow, iron red 2, reverse. After selecting a palette and clicking Invert, the temperature and width distribution of the palette will be displayed in reverse.

### 5.1.2.7 Gallery Introduction

Gallery: Click to enter the gallery, as shown in the figure.
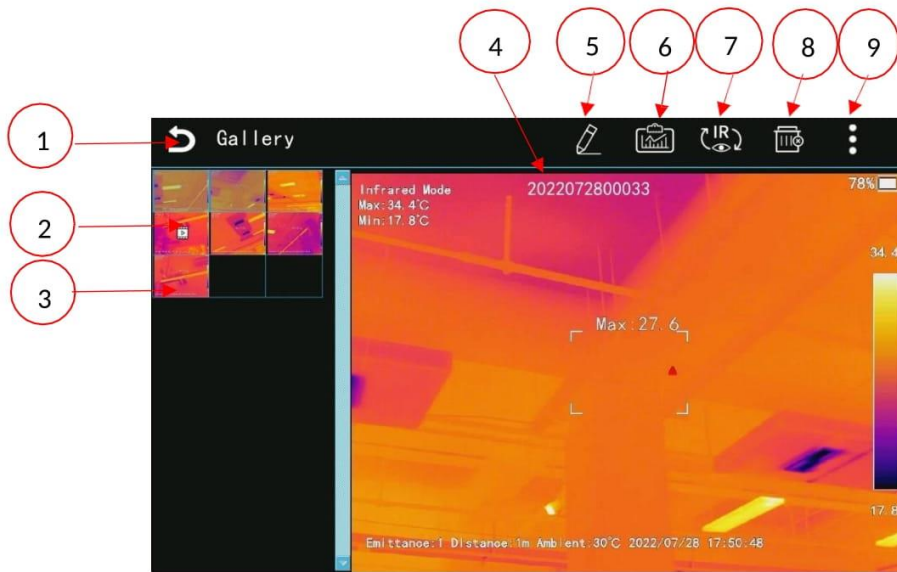


| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Back Button | Click to return to the previous interface. |
| 2 | Media Preview | Video thumbnails are displayed and placed with pictures. |
| 3 | Picture Thumbnail | Picture thumbnail display, three pieces per line. |
| 4 | 2022072800033 | Image File Name |
| 5 | Analysis Mode Button | Click to enter the analysis mode to edit the image. |
| 6 | Report | Click to enter the create report interface. |
| 7 | Toggle Button | Click to switch freely between infrared and visible light. |
| 8 | Delete Button | Click to delete the selected picture. |
| 9 | More... | Click the expand more actions button |

| Ident Number | Name | Description of Use |
|---|---|---|
| 1 | Text Annotations | You can add text notes to the thermal image file. When using this function, you can enter text information on the touch screen of the thermal imager to add notes to the thermal image file. If you need to add text annotations, operation steps: click the text notes button to enter the text annotations submenu. <br> ➢ Click the text box, the text input soft keyboard will pop up automatically under the touch screen, and switch to the appropriate text input method. <br> ➢ Input the text information to be noted, click the blank area of the screen, and automatically exit the text input soft keyboard. <br> ➢ Click the save button to automatically save the text information to the thermal image file. <br> ➢ Click cancel to close the text box without saving the text information to the thermal image file. |

| | | |
|---|---|---|
| 2 | Voice Notes | You can add voice notes to the thermal image file. When using this function, you can input voice information through the connected Bluetooth earphone or the microphone of the thermal imager to add notes to the thermal image file. If you need to add voice notes, please follow the steps below:<br>➢ Click the voice notes button to enter the notes submenu.<br>➢ Click the record button to start recording.<br>➢ Click the play button to start playing.<br>➢ Click the pause button to pause the play.<br>➢ Click the delete button to delete the currently recorded sound information and re-record.<br>After recording, click the close button to close the voice<br>notes interface and save the voice information to the thermal image file. |
| 3 | Notes to Attached Drawings | After clicking the thumbnail with attached drawing identification, click the attached drawing annotation icon in more to enter the attached drawing list. Double<br>click in the thumbnail to enter the attached drawing list. |
| 4 | Zoom out Button | Zoom out pictures |
| 5 | Zoom in Button | Zoom in pictures |
| 6 | Multiple Selection Button | Click to make multiple selections. |

### 5.1.2.8 More Function Introduction

Swipe up from the main menu on the right side of the main screen, the 5th menu - more: contains functions: laser light, lighting, zoom.



➢ Laser Light: Turn on and off the laser light, click the button to turn on the laser light, and then click again to turn off the laser light.

➢ Lighting: Turn on and off the lighting, click the button to turn on the lighting, and then click to turn off the lighting again.

➢ Zoom: A zoom bar will appear after clicking. You can click "+" above and "-" below to represent zoom in and zoom out in turn. At the same time, the magnification is displayed in the upper right corner of the screen.

### 5.1.3 Set Submenu Function Description

### 5.1.3.1 Save Setting

➢ Visible Light: Default

➢ Open: After opening, the visible light image will be saved when the picture is saved. If it is closed, it will not be saved.

➢ File Name: the file name can be modified.

➢ Information Display: relevant information displayed on the main interface can be controlled.

➢ Storage: Storage location: Yu can modify the set storage location and operate the memory card.

(Notice: If the SD card cannot be recognized, please insert the SD card into the instrument for formatting)
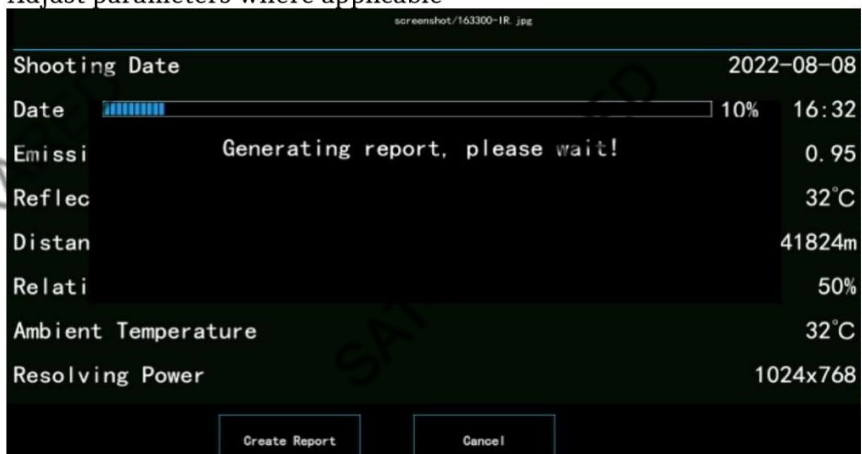
### 5.1.3.2 Report Generation

The Satir P1 has a built-in report generator

. Select the report generator



Adjust parameters where applicable

**5.1.3.3 Alarm Setting**

Color alarm and voice alarm can be set. If the setting range is exceeded, an alert prompt will be sent.

(1) Color Alarm: It is generally used to quickly screen the abnormal temperature area of the measured target. Two color alarm modes of high temperature alarm and low temperature alarm can be set. The operation steps and the effect after setting are as follows:

   ➢ Go to Settings - Alarm Settings - Color Alarm.

   ➢ Turn on the upper or lower threshold switch as required. The color alarm button is divided into upper limit temperature and lower limit temperature, high and low temperature color alarm mode, which can be controlled to close the alarm mode separately.

   ➢ Select alarm color: Divided into automatic and other monochrome.

   ➢ When Auto is selected, the area that matches the warning turns gray.

   ➢ When other single color is selected, such as brown, the color corresponding to the alarm area will change to brown.



(2) Voice Alarm: When the temperature falls below the preset high or low temperature threshold, a sharp and intermittent beep is triggered to alert the inspector. The operation steps are as follows:

   ➢ Go to Settings - Alarm Settings - Voice Alarm.

➢ Turn on the upper or lower threshold switch as required. The voice alarm button is divided into upper limit temperature and lower limit temperature, which can be controlled to close the alarm mode respectively.

➢ After the switch is turned on, when there are conditions that meet the alarm, it will emit sharp and intermittent beeps after returning to the real-time screen.

➢ The voice alarm can also be set in the secondary menu of the measurement tool after adding the measurement tool, click the measurement tool.

### 5.1.3.4 Image Setting

(1) Preview Image: It is enabled by default. After capturing, the image will be previewed first, and then saved after clicking save. Click to close. After closing, snap and save directly without entering the preview mode.

(2) Super Pixel: It is closed by default. Click open to capture the image for super pixel processing.

(3) HDMI: Off by default, click on, and the screen can be projected to the display after connecting the HDMI cable.

(4) Image Enhancement: It is off by default. Click open to enhance the image.

(5) Video Format: It is closed by default. After it is opened, there are pal and NTSC modes, and different video output modes can be selected.

### 5.1.3.5 System Setting

(1) Temperature Measurement Range: Low temperature section / high temperature section, and the temperature section can be switched manually.

(2) Power Plan: Set the brightness of the display screen, and the time of automatic sleep and automatic shutdown.

(3) Automatic Baffle: Automatic baffle correction time interval can be set.

(4) Date and Time: The current year, month, day, hour, minute and second of the equipment can be modified.

(5) Unit Setting: Set the temperature and distance unit.

(6) System Information: Equipment information can be viewed.

(7) Program Update: Click to check the update program.

(8) Restore Factory Settings: Click to restore factory settings.

### 5.1.3.6 Intelligent Assistance



（1）Bluetooth Function: At present, the Bluetooth function is mainly the function of recording and playing voice annotations through the Bluetooth earphone after the connection is successful. After the connection is successful, the Bluetooth logo on the top of the main screen, the initial connection steps are as follows:
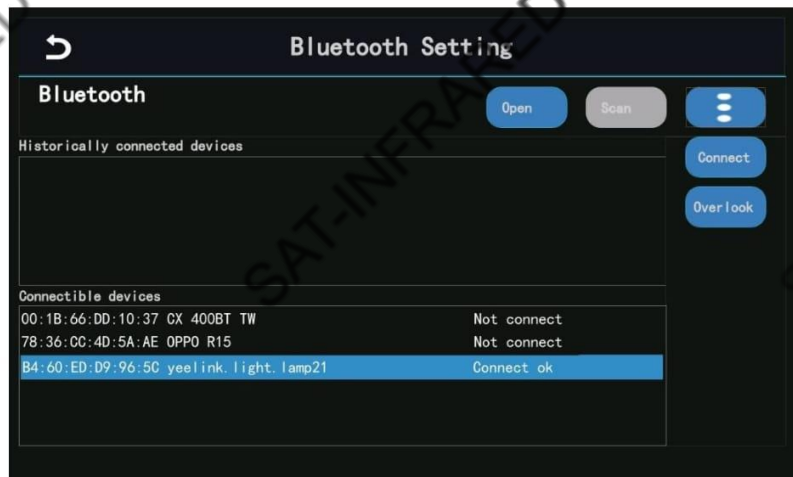


➢ On-Scan: Click the on button, click the Scan button, and the available earphone devices (ensure that the Bluetooth earphone is turned on and in pairing mode within the communication range) will appear in the connectable devices.

➢ Click the scanned earphone device to connect, and when the earphone prompts connected or the list shows connect ok prompt,

you can

successfully use the Bluetooth earphone to record and play the operation voice annotation.

Bluetooth other button function introduction:
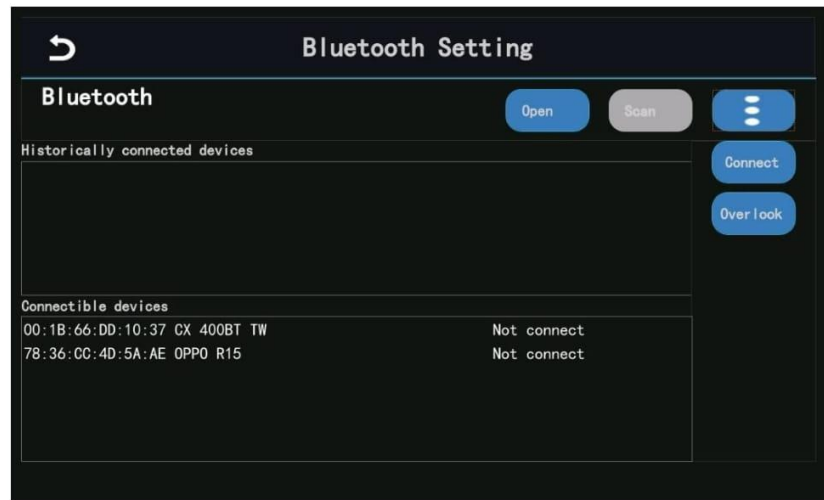


➢ Scan Button: Click Scan to scan all historically connected devices and connectable devices (when you enter the Bluetooth page for the first time after an abnormal disconnection and restart, the scan button will be grayed out, and you can click the scan button after returning to blue).
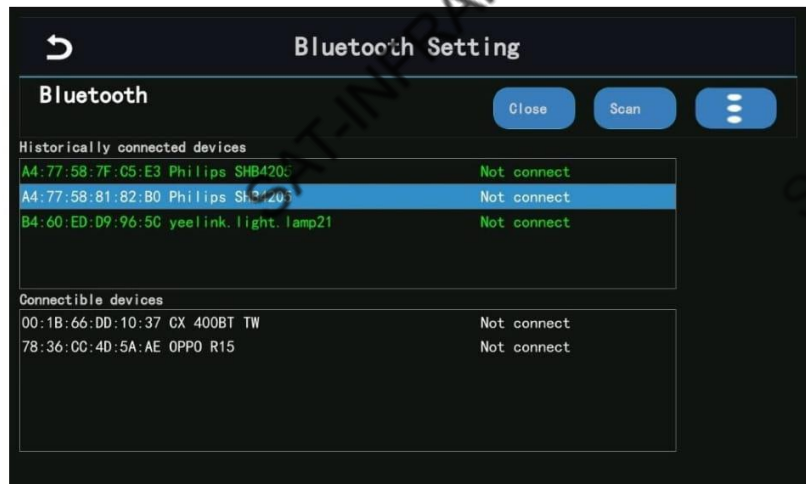


➢ Disconnect: Select the device, click Disconnect, and when you hear disconnected or the page shows that Bluetooth has been disconnected, the connection is successfully disconnected.

➢ Ignore Device: Select the device in the historical connection device, click Ignore to remove the device from the historical connection device, and it can be displayed again if it is within the communication range in the next scan.

➢ Turn off Bluetooth: when the Bluetooth is successfully connected in the connectable devices, click turn off, the Bluetooth function will be turned off, and the device will appear in the history connected devices when it is enabled next time.

➢ Automatic connection after abnormal disconnection: When the successfully connected Bluetooth earphone goes out of the Bluetooth range or restarts, shuts down, illegally powers off, enters the communication range again or starts the instrument, the Bluetooth earphone will go through at least one round of connection (i.e., disconnect -connect-disconnect-pairing-connect), the Bluetooth earphone can be automatically connected.

(2) Button Parameters: The information related to button settings can be customized. The smaller the value, the faster the response.

➢ Double Click Response Delay: The interval time between the first click and the second click. The default value is 80ms.

➢ Long Press Response Delay: How long it takes to respond in the long press state. The default value is 1000ms.

➢ Forced Shutdown Delay: Long press the power button to wait for the time. The default value is 6000ms.

➢ Electric Focus Coarse Adjustment Response Delay: How long it takes for the electronic focus to be turned left or right to respond. The default value is 180ms.

➢ Auto Focus Response Delay: How long it takes to press the electronic focus button to respond to the auto focus function. The default value is 150ms.

➢ Electric Focusing Fine-tuning Step: The setting of electronic focusing to move one step to the left or right, the default value is 10.

(3) Temperature Decimal Display: The normal temperature section and high temperature section switches are independent of each other, and can be turned on or off independently.

> ➢ The normal temperature section is turned on by default, and a decimal is displayed in the real-time screen;

> ➢ The high temperature section is closed by default, and the integer temperature is displayed on the real-time screen.

## 5.2 Dialog and Prompt Box

### 5.2.1 Dialog

Refers to a series of dialog boxes in the instrument to be selected. Examples and screenshots are as follows:
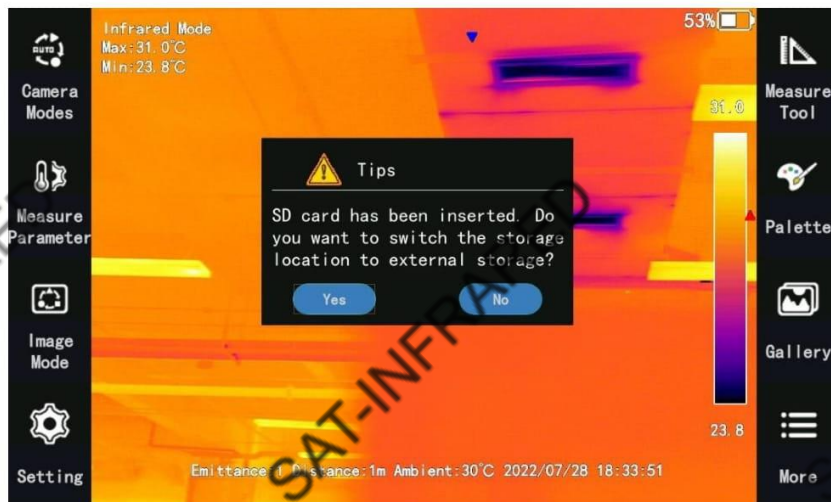


> ➢ Dialog Name: "Save"
> ➢ Dialog Content: "SD card has been inserted; do you want to switch the storage location to external storage?"
> ➢ Dialog Options: "Yes, No"

### 5.2.2 Prompt Box

Refers to a series of prompt boxes that disappear automatically without making a selection in the instrument. Examples and screenshots are as follows:
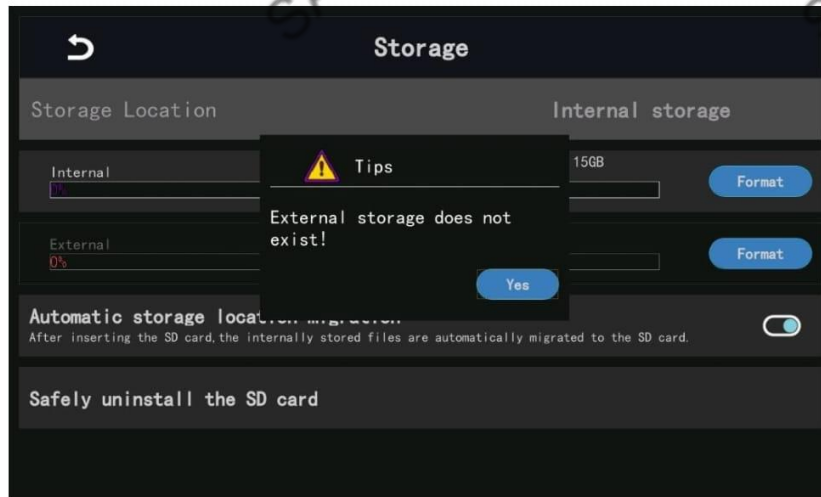
- ➢ Prompt Box Name: "Save"
- ➢ Contents of the Prompt Box: "External storage does not exist!"
- ➢ Prompt Box Option: "Yes"

## 5.3  Menu Configuration

| 1. Auto - Camera Mode | 2. Measure Parameters | 3. Image Mode | 4. Settings |
|---|---|---|---|
| 1.1.   Single Photo | 2.1.   Emittance [ 0 TO 1] | 3.1.   Visual | 4.1.   Save settings |
| 1.2.   Shoot Video | 2.2.   Measure Distance [0 TO 150+ Meter] | 3.2.   Fusion Mode | 4.1.1.   Visible Light   On / Off  (save visual image with thermal) |
| 1.3.   Full Radiate Video (Not  working yet ) | 2.3.   Ambient Temperature [manual & Auto] | 3.3.   PIP Mode | 4.1.2.   File Name (On / Off settings) |
| 1.4.   Auto Photo | 2.4.   Relative Humidity [ 0 to 100%] | | 4.1.2.1.   Prefix |
| | 2.5.   Reflective Temperature [ manual & Auto] | | 4.1.2.2.   Date |
| | 2.6.   Transmissivity [1 to 0] | | 4.1.2.3.   Time |
| | 2.7.   Compensation [2.5 to – 2.5C] | | 4.1.2.4.   Number |
| | | | 4.1.2.5.   Suffix |
| | | | 4.1.3.   Information Display (On / Off settings) |
| | | | 4.1.3.1.   Palette |
| | | | 4.1.3.2.   Company Logo |
| | | | 4.1.3.3.   Emissivity |
| | | | 4.1.3.4.   Measure Distance |
| | | | 4.1.3.5.   Ambient Temperature |
| | | | 4.1.3.6.   Time Display |
| | | | 4.1.3.7.   Relative Humidity |
| | | | 4.1.3.8.   Reflective Temperature |
| | | | 4.1.3.9.   Transmissivity |
| | | | 4.1.4.   Storage |
| | | | 4.1.4.1.   Internal Storage Status |
| | | | 4.1.4.2.   External Storage Status |
| | | | 4.1.4.3.   Automatic Storage Location Migration |
| | | | 4.2.   Alarm setting |
| | | | 4.2.1.   Sound Warning |
| | | | 4.2.1.1.   On / Off |
| | | | 4.2.1.2.   Lower Threshold ℃ |
| | | | 4.2.1.3.   On / Off |
| | | | 4.2.1.4.   Upper Threshold ℃ |
| | | | 4.2.2.   Colour Warning   (like an isotherm [Isotherm on screen  header instead of Alarm settings) |
| | | | 4.2.2.1.   On / Off |
| | | | 4.2.2.2.   Lower Threshold ℃ |
| | | | 4.2.2.3.   On /Off |
| | | | 4.2.2.4.   Upper Threshold ℃ |
| | | | 4.2.2.5.   Alarm Colour,  Auto , Brown, Purple, Blue, Green,  Yellow, Orange, Red, |
| | | | 4.3.   Image Setting (On / Off setting) |
| | | | 4.3.1.   Preview the Image |
| | | | 4.3.2.   Super Pixel  (looks like double resolution – view when in  zoom mode) |
| | | | 4.3.3.   HDMI |
| | | | 4.3.4.   Image Enhancement |
| | | | 4.3.5.   Video Format |
| | | | 4.3.5.1.   Pal / NTSC |
| | | | 4.4.   System Setting |
| | | | 4.4.1.   Temperature Measurement Range |
| | | | 4.4.1.1.   -40 ℃ to  150 ℃ |
| | | | 4.4.1.2.   +150 ℃ to  650 ℃ |
| | | | 4.4.2.   Power Plan |
| | | | 4.4.2.1.   Brightness  (0 to 100%) |
| | | | 4.4.2.2.   Auto Sleep  (0 to 12Hrs) |
| | | | 4.4.2.3.   Auto Shut down  (0 to 12Hrs) |
| | | | 4.4.3.   Automatic Baffle                (NUC of shutter) |
| | | | 4.4.3.1.   1,2,5,10,15,30,60  min |
| | | | 4.4.4.   Date and Time |
| | | | 4.4.4.1.   Set Date [save] |
| | | | 4.4.4.2.   Set Time |
| | | | 4.4.5.   Unit Setting |
| | | | 4.4.5.1.   Celsius |
| | | | 4.4.5.2.   Fahrenheit |
| | | | 4.4.5.3.   Kelvin |
| | | | 4.4.5.4.   Meters |
| | | | 4.4.5.5.   Foot |
| | | | 4.4.6.   System Information |
| | | | 4.4.6.1.   Manufacture                                SATIR Europe  (Ireland) co Ltd |
| | | | 4.4.6.2.   Product name                           Infrared thermal  Imager |
| | | | 4.4.6.3.   Model                                         P1 |
| | | | 4.4.6.4.   Serial Number                           JDH3091208029 |
| | | | 4.4.6.5.   Hardware                                   V2.0 |
| | | | 4.4.6.6.   Software                 V4.0.6.3_SATIRc5afcc |

| | | | |
|---|---|---|---|
| | | | 4.4.6.7.  FPGA               V2021.09.28<br>4.4.6.8.  Date                   2022-07<br>4.4.6.9.  Mac                   20:11:d1:da:00:29<br>4.4.7.    Program Update<br>4.4.8.    Restore Factory Setting<br>4.4.9.    Language Switch<br>    4.4.9.1.  China<br>    4.4.9.2.  English<br>4.5.    Intelligent Assistance<br>    4.5.1.  Bluetooth<br>    4.5.2.  Key Parameters<br>    4.5.3.  Temperature Decimal Display<br>    4.5.4.  Viewfinder (param set) |
| **5.    Baffle Correction**<br>**(manual shutter)** | **6.    Measure Tool**<br>6.1.  Spot<br>6.2.  Broken Line<br>   6.2.1.  Broken Line, level vertica line<br><br>6.3.  Rectangle<br>6.4.  Circle<br>   6.4.1.  [Spot , Broken Line, Rectangle , Circle]<br>   6.4.2.  Move<br>   6.4.3.  Size<br>   6.4.4.  Delete<br>   6.4.5.  Next<br>   6.4.6.  Show<br>   6.4.7.  Reference Point<br>   6.4.8.  Emissivity<br>   6.4.9.  Overlimit Alarm<br>6.5.  Full Screen<br>6.6.  Clear<br>6.7.  Reference Point<br>6.8.  Hide | **7.    Palette**<br>7.1.  Iron red,<br>7.2.  white Hot,<br>7.3.  Black Hot,<br>7.4.  tea yellow,<br>7.5.  blue Orange,<br>7.6.  Rainbow , Iron red<br>7.7.<br>    Reversal (RGB) | **8.    Gallery** |
| **9.    More**<br>9.1.  Zoom<br>9.2.  Lamp<br>9.3.  Laser | **A.    Saved image from front button**<br>a.  Text Notes<br>b.  Voice Notes<br>c.  Save<br>d.  Measure Parameter<br>e.  Measure Tool<br>f.  Palette<br>g.  Sign | **B.    Touch Temperature Bar or long press on the left / right arrows**<br>a.  Auto<br>b.  Select top or bottom and the scroll up or down | **C.    Zoom In**<br>a.  Long press of the top or bottom arrow |

## 6 Thermal Imager Maintenance

### 6.1 Cleaning the Thermal Imager

Cleaning supplies: warm water or mild cleaning liquid, soft cloth.

Cleaning steps:

➢ Use a soft cloth to soak up an appropriate amount of liquid.

➢ Clean the parts with a soft cloth.

**! Note:** Do not apply solutions or liquids to the thermal imager, cables or other parts. This can cause damage.

### 6.2 Cleaning the IR Lens

Cleaning supplies: commercial lens cleaning solution with a concentration of isopropyl alcohol over 30% or ethanol with a concentration of 96%, medical cotton.

Cleaning steps:

➢ Use medical cotton dipped in ethanol.

➢ Wipe the lens with medical cotton.

**! Note:**

➢ Medical cotton is a one-time item and should not be reused.

➢ Be careful when cleaning the infrared lens, the lens has a precise anti-reflection coating.

➢ Do not use too much force to clean the IR lens, it may damage the anti-reflection coating.

SPECIFICATION

**Manufacturer Information**

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